Claims

1. A terminal positioning method in a global positioning system (GPS) satellite-invisible area in a code division multiple access (CDMA) mobile communication network by using a terminal, a plurality of location detectors (LDs) for generating and sending offsets, a position determination entity (PDE) for controlling a position determination of the terminal and an LD mapping server including a position information database, comprising the steps of:

(a) allowing the terminal which received a positioning request to obtain a reference pilot signal of a base transceiver station or a repeater and LD pilot signals generated from the location detectors;

(b) transmitting information on the reference pilot signal or the LD pilot signals to the PDE by using a pilot strength measurement message (PSMM) if the reference pilot signal or the LD pilot signals are received with a strength not smaller than a predetermined value;

(c) calculating a chip-based pseudo noise code phase from the PSMM transmitted to the PDE;

(d) transmitting the pseudo noise code phase to the LD mapping server if the pseudo noise code phase calculated at step (c) is a phase of one of positioning pseudo noise codes allocated for the position determination; and

(e) obtaining position information of the terminal by using the pseudo noise code phase transmitted to the LD mapping server.

2. The method of claim 1, wherein the positioning pseudo noise codes are predetermined in the CDMA mobile communication network.

3. The method of claim 1, wherein at least two positioning pseudo noise codes are predetermined.

4. The method of claim 1, wherein the LD pilot signals are generated by intentionally adding offsets to the positioning pseudo noise codes.

5. The method of claim 1 or 4, wherein each of the offsets is not larger than 64 chips.

6. The method of claim 1, wherein, if two positioning pseudo noise codes are predetermined, the difference between each offset to be added in the LD pilot signals is not larger than 128 chips.

7. The method of claim 1, wherein the difference between respective offsets to be added in the LD pilot signals generated from each LD corresponds to a unique identifier for differentiating said each LD.

8. The method of claim 1, wherein the LD pilot signals are transmitted with a strength which is lower than that of the reference pilot signal.

9. The method of claim 1, wherein, at step (a), each LD pilot signal includes a time delay component which is used to identify said each LD pilot signal as a signal with a first arrival path if said each LD pilot signal is received in the terminal.

10. The method of claim 1, wherein, at step (b), the predetermined value is T_ADD.

11. The method of claim 1, wherein, at step (b), the information on the reference pilot signal transmitted from the terminal is at least one among a pseudo noise code phase of the reference pilot signal, the strength of the reference pilot signal and a measurement error of the pseudo noise code phase.

12. The method of claim 1, wherein the information on the LD pilot signals transmitted from the terminal is at least one of a pseudo noise code phase of each LD pilot signals, the strength of each LD pilot signal and a measurement error of the pseudo noise code phase.

13. The method of claim 11 or 12, wherein the phase is measured and transmitted on a 1/16 chip basis.

14. The method of claim 1, wherein, in the position information database, the difference between respective offsets to be added in the LD pilot signals generated from each LD corresponds to the position information including an address, a name, a floor or a representative shop of its corresponding building.

15. The method of claim 1, wherein the CDMA mobile communication network determines if the terminal is in a traffic state and, if not so, has the terminal shift into the traffic state.

16. The method of claim 1 or 15, wherein the CDMA mobile communication network transmits a pilot measurement request order (PMRO) message to the terminal shifted to the traffic state, and, if the terminal shifted to the traffic state receives the PMRO message, the terminal transmits the PSMM in which information on the reference pilot signal or the LD pilot signals is added.

17. The method of claim 1, wherein the terminal includes PDA (Personal Digital Assistant), cellular phone, PCS (Personal Communication Service) phone, hand-held PC (Personal Computer), GSM (Global System for Mobile) phone, W-CDMA

(Wideband CDMA) phone, EV-DO (Evolution Data Only) phone, EV-DV (Evolution Data and Voice) phone and MBS (Mobile Broadband System) phone.

18. A terminal positioning system in a global positioning system (GPS) satellite-invisible area, comprising:

a plurality of location detectors (LDs) for adding preset offsets to positioning pseudo noise codes predetermined in a code division multiple access (CDMA) mobile communication network, to generate and send LD pilot signals;

a terminal for obtaining a reference pilot signal of a base transceiver station or a repeater and the LD pilot signals if a positioning request is received and, for transmitting a pilot strength measurement message (PSMM) in which information on the reference pilot signal or the LD pilot signals is added if the reference pilot signal or the LD pilot signals are received with a strength not smaller than a predetermined value;

a position determination entity (PDE) for calculating a chip-based pseudo noise code phase from the PSMM received from the terminal and, if the calculated pseudo noise code phase is a phase of one of positioning pseudo noise codes, transmitting the calculated pseudo noise code phase; and

a LD mapping server for generating position information of the terminal by using the pseudo noise code phase received from the PDE.

19. The system of claim 18, wherein at least two positioning pseudo noise codes are predetermined.

20. The system of claim 18, wherein each of the offsets is not larger than 64 chips.

21. The system of claim 18, wherein, the difference between respective offsets to be added in the LD pilot signals is not larger than 128 chips if two positioning pseudo noise codes are predetermined.

22. The system of claim 18, wherein the difference between respective offsets to be added in the LD pilot signals generated from each LD corresponds to a unique identifier for differentiating said each LD.

23. The system of claim 18, wherein the LD pilot signals are transmitted with a strength which is lower than that of the reference pilot signal.

24. The system of claim 18, wherein each LD generates one or more pseudo noise codes to which different offsets are assigned, respectively, and adds a time delay component to each of the pseudo noise codes, thereby generating and sending the LD pilot signals.

25. The system of claim 24, wherein the time delay component is used as information for identifying each LD pilot signal as a signal with a first arrival path if said each LD pilot signal is received in the terminal.

26. The system of claim 18, wherein the predetermined value is T_ADD.

27. The system of claim 18, wherein the information on the reference pilot signal transmitted from the terminal is at least one of a pseudo noise code phase of the reference pilot signal, the strength of the reference pilot signal and a measurement error of the pseudo noise code phase.

28. The system of claim 18, wherein the information on the LD pilot signals transmitted from the terminal is at least one of a pseudo noise code phase of each LD pilot signal, the strength of each LD pilot signal and a measurement error of the pseudo noise code phase.

29. The system of claim 27 or 28, wherein the phase is measured and transmitted on a 1/16 chip basis.

30. The system of claim 18, wherein the LD mapping server includes a position information database in which the difference between respective offsets to be added in the LD pilot signals generated from each LD corresponds to the

position information including an address, a name, a floor or a representative shop of its corresponding building.

31. The system of claim 18, wherein the CDMA mobile communication network determine if the terminal is in a traffic state and, if not so, forces the terminal to be shifted to the traffic state.

32. The system of claim 18 or 31, wherein the CDMA mobile communication network transmits a pilot measurement request order (PMRO) message to the terminal shifted to the traffic state, and, if the terminal shifted to the traffic state receives the PMRO message, the terminal transmits the PSMM in which information on the reference pilot signal or the LD pilot signals is added.

33. The system of claim 18, wherein the terminal includes PDA (Personal Digital Assistant), cellular phone, PCS (Personal Communication Service) phone, hand-held PC (Personal Computer), GSM (Global System for Mobile) phone, W-CDMA (Wideband CDMA) phone, EV-DO (Evolution Data Only) phone, EV-DV (Evolution Data and Voice) phone and MBS (Mobile Broadband System) phone.